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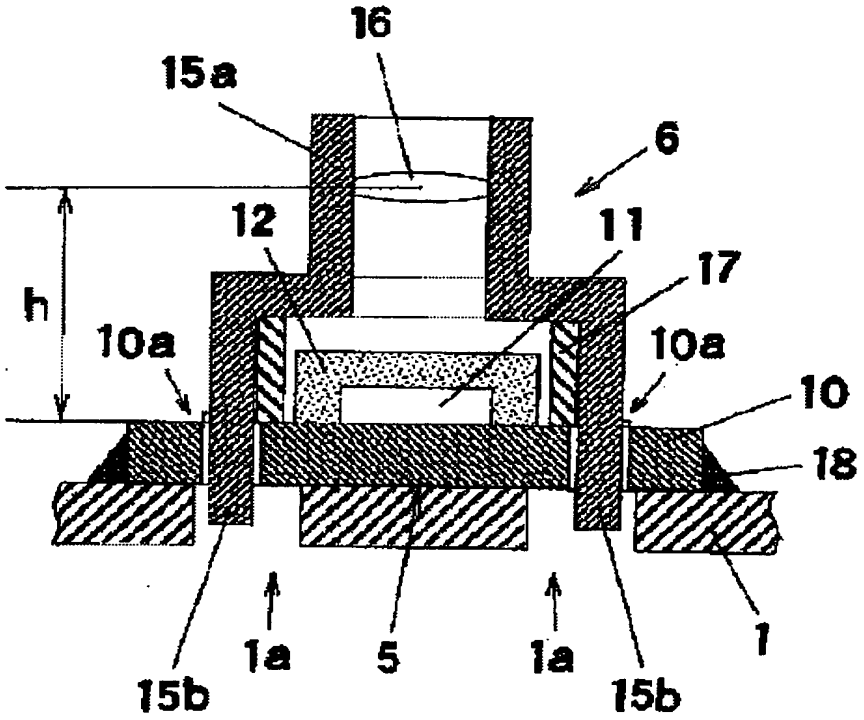
(54) CAMERA TO BE MOUNTED ON PRINTED CIRCUIT BOARD

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a camera to be mounted on a printed circuit board than can be mounted efficiently on the printed circuit board.

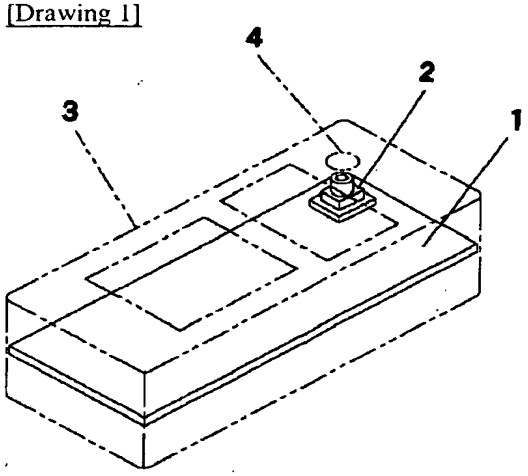
SOLUTION: In the board mounting camera, that is mounted on the printed circuit board of an information terminal such as a mobile phone, a camera module 2 consists of a board module 5 including a CCD area sensor 11 and of a lens module 6, which includes a lens 16, a heat-resistant material, such as Pyrex (R) glass with a heat-resistant temperature higher than a heating temperature in the mounting process of electronic components on the printed circuit board 1 is adopted for a material of the lens 16. Thus, the camera module 2 can be mounted on the printed circuit board, with the same mounting process as for the other electronic components, and manual soldering for the camera module which has conventionally been required can be avoided, to improve the productivity.



5 基板モジュール
6 レンズモジュール
10 サブ基板
11 CCDエリアセンサ
16 レンズ

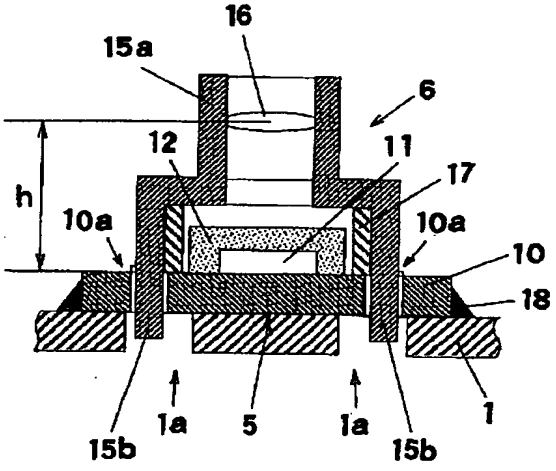
DRAWINGS

[Drawing 1]



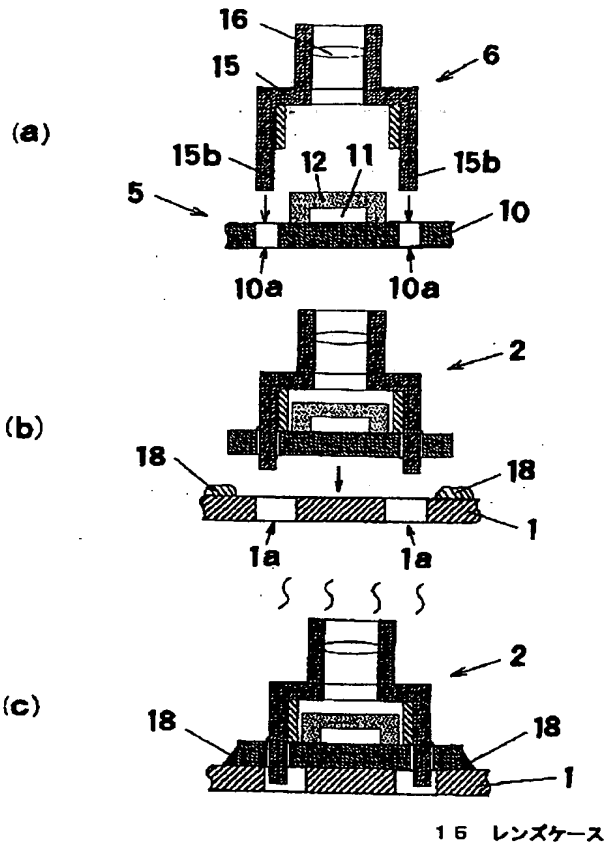
1 回路基板
2 カメラモジュール

[Drawing 2]



5 板モジュール
6 レンズモジュール
10 サブ基板
11 CCDエリアセンサ
16 レンズ

[Drawing 3]



１５　レンズケース

[Translation done.]

* NOTICES *

1. This document has been translated by computer.So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The camera for substrate mounting which outputs a picture signal by having the light-receiving section by which the pixel which is characterized by providing the following, and which is mounted in the circuit board and performs photo electric translation was arranged, and carrying out image formation of the optical picture for an image pck-up to this light-receiving section. The light-receiving module mounted in the aforementioned circuit board including the photo detector in which the aforementioned light-receiving section was formed. It is heat-resistant temperature with the aforementioned lens more expensive than heating temperature [in / the mounting process of the electronic parts to the aforementioned circuit board / it has a lens attaching part holding the lens to which image formation of the optical picture is carried out on the light-receiving section, and].

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the camera for substrate mounting directly mounted in the circuit boards, such as a Personal Digital Assistant device.
[0002]
[Description of the Prior Art] What was equipped [that advanced features progress in recent years and information terminal equipments, such as a cellular phone, can be used as a TV phone and] with the image pck-up function is used. In such a device, the composition which carries out small modularization of the CCD camera which picturizes, and is directly mounted in the circuit board is adopted in many cases. This camera module has composition which generally combined the lens for a CCD area sensor and an image pck-up, uses junction meanses, such as a soldered joint and an electric conduction binder, for the circuit board for the camera module assembled beforehand like other electronic parts, and is mounted.
[0003]
[Problem(s) to be Solved by the Invention] however, the heating temperature (for example, heat-curing temperature in the case of using the reflow temperature in the case of using a soldered joint, and an electric conduction binder) of the junction process of electronic parts with the heat-resistant temperature of the lens for an image pck-up common in case a camera module is mounted in the circuit board -- a low -- from things, after finishing mounting of other electronic parts, the method of mounting a camera module in the circuit board independently was adopted
[0004] The complicated work of soldering a joint was needed paying careful attention so that a heat damage may not be given to a camera module after doing the mounting work of this camera module by the handicraft and carrying out alignment of the small parts to a circuit electrode. For this reason, the mounting work of the conventional camera module had low productivity, and the policy for the improvement in productivity was called for.
[0005] Then, this invention aims at offering the camera for substrate mounting which can do the mounting work to the circuit board efficiently.
[0006]
[Means for Solving the Problem] It is the camera for substrate mounting which outputs a picture signal by mounting the camera for substrate mounting according to claim 1 in the circuit board, having the light-receiving section by which the pixel which performs photo electric translation was arranged, and carrying out image formation of the optical picture for an image pck-up to this light-receiving section. The light-receiving module mounted in the aforementioned circuit board including the photo detector in which the aforementioned light-receiving section was formed, Having a lens attaching part holding the lens to which image formation of the optical picture is carried out on the light-receiving section, the aforementioned lens consists of the quality of the material which has heat-resistant temperature higher than the heating temperature in the mounting process of the electronic parts to the aforementioned circuit board.
[0007] According to this invention, a camera module can be mounted in the circuit board at the same mounting process as other electronic parts by considering as the quality of the material which has heat-resistant temperature higher than heating temperature [in / the mounting process of the electronic parts to the circuit board / for the quality of the material of the lens which carries out image formation of the optical picture on the light-receiving section].
[0008]
[Embodiments of the Invention] Next, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 is [the cross section of the camera for substrate mounting of the gestalt of 1 operation of this invention and drawing 3 of the perspective diagram of the circuit board of the gestalt of 1 operation of this invention and drawing 2] process explanatory drawings of the mounting method of the camera for substrate mounting of the gestalt of 1 operation of this invention.
[0009] In drawing 1 , the circuit board 1 is a mounting substrate in which the electronic parts which constitute the electronic circuitry of move information terminal equipments, such as a cellular phone, are mounted, and the camera module 2 is mounted in the circuit board 1. The camera module 2 is the small camera for substrate mounting which combined the CCD area sensor and the lens, and picture taking in for an image pck-up has come to be able to do the circuit board 1 in which electronic parts were mounted in the state of the completion incorporated in the covering case 3 through the opening 4 for an image pck-up prepared in the covering case 3. In addition, in drawing 1 , illustration of electronic parts other than camera module 2 is omitted.
[0010] As shown in drawing 2 , the camera module 2 consists of a substrate module 5 (refer to drawing 3 (a)) and a lens module 6 (refer to drawing 3 (c)), and the camera module 2 whole is mounted in the circuit board 1 by mounting the substrate module 5 in the circuit board 1. The substrate module 5 is a light-receiving module which mounted the CCD area sensor 11 which is a photo detector for an image pck-up on the sub substrate 10, and the CCD area-sensor 11 upper surface

is closed by the resin 12.
[0011] The light-receiving section by which many pixels which perform photo electric translation were arranged in the shape of a grid is formed in the upper surface of the CCD area sensor 11, and the charge which each pixel stored electricity is outputted as a picture signal by carrying out image formation of the optical picture to this light-receiving section. The electrode for connection of the sub substrate 10 (not shown) and the circuit electrode (not shown) of the circuit board 1 upper surface flow through the sub substrate 10 electrically while being mounted in the circuit board 1 by the conductive resin binder 18 and fixing the sub substrate 10 to the circuit board 1 by this.
[0012] The lens module 6 is equipped with the lens case 15 as a lens attaching part. wearing to which the upper part of the lens case 15 is electrode-holder section 15a holding a lens 16, and the lower part was prepared in the sub substrate 10 -- a hole -- it is applied-part 15b which inserts in in 10a and fixes the lens module 6 to the sub substrate 10 this fixation -- applied-part 15b -- wearing -- a hole -- the method of pressing fit and fixing to 10a, the method of pasting up by the binder, etc. are used
[0013] Here, the quality of the material of a lens 16 is explained. A lens 16 consists of the quality of the material which has heat-resistant temperature higher than the heating temperature in the mounting process of the electronic parts to the circuit board 1. In mounting of electronic parts, when joining electronic parts by the conductive resin binder, also in any in the case of being based on a soldered joint, the heating process which heats the substrate after carrying electronic parts to predetermined temperature exists.
[0014] That is, by the method using a resin binder, the substrate after an element placement is heated to about 200 degrees C, and, in a soldered joint, is heated to about 230 degrees C. However, generally the lens used for the small camera module directly mounted in a substrate is manufactured in many cases by the low resin rather than the heating temperature with heat-resistant above-mentioned temperature.
[0015] For this reason, conventionally, when a camera module needed to be directly mounted in the circuit board, after mounting other electronic parts by the usual method, the soldered joint according only a camera module to a handicraft etc. was mounted by the special method of not giving too much heat to a lens, and this caused a productivity fall.
[0016] On the other hand, it is made to use heat resisting glasses (tradename : a Pyrex glass, 230 degrees C of common service temperatures, 500 degrees C of maximum service temperatures), such as a borosilicate glass, as the quality of the material of a lens 16 with the gestalt of this operation. For this reason, a lens 16 cannot receive a heat damage by heating in the above-mentioned mounting process, and it can mount efficiently like other electronic parts. Of course, as long as it is with the quality of the material with which the above-mentioned conditions are filled about heat-resistant temperature, you may use the quality of the material except being shown in the above-mentioned example of the quality of the material.
[0017] the color with which it was beforehand equipped in the lens case 15 when equipping the sub substrate 10 with the lens case 15 -- the soffit section of a member 17 is fixed where the upper surface of the sub substrate 10 is contacted Thereby, it is maintained at height with the distance h proper although image formation of the optical picture with a lens 16 is carried out to the inferior surface of tongue of a lens 16 and the CCD line sensor 11, and alignment of the lens 16 is correctly carried out to the light-receiving section of the CCD area sensor 11.
[0018] Next, with reference to drawing 3 , the mounting method of mounting the camera module 2 to the circuit board 1 is explained. As shown in drawing 3 (a), the substrate module 5 and the lens module 6 are beforehand assembled in advance of mounting to the circuit board 1, and the camera module 2 is formed.
[0019] This camera module 2 is mounted in the circuit board 1 in the component-mounting process which mounts other electronic parts which are not illustrated in the circuit board 1. As first shown in drawing 3 (b), the camera module 2 is carried in the predetermined mounting position of the circuit board 1 where the resin binder 18 was applied beforehand. And if loading of all electronic parts is completed, as the circuit board 1 is sent to a heating process and it is shown in drawing 3 (c), it will be heated to the heat-curing temperature (for example, 200 degrees C) of the resin binder 18, and a predetermined-time heating state will be held.
[0020] Thereby, the resin binder 18 heat-hardens and the camera module 2 is mounted in the circuit board 1 with other electronic parts. Since the quality of the material with heat-resistant temperature higher than the heating temperature in heating process is used for the quality of the material of a lens 16 at this time, in heating process, a lens 16 does not receive a heat damage.
[0021]
[Effect of the Invention] Since it considered as the quality of the material which has heat-resistant temperature higher than heating temperature [in / the mounting process of the electronic parts to the circuit board / for the quality of the material of the lens which carries out image formation of the optical picture on the light-receiving section] according to this invention, a camera module can be mounted in the circuit board at the same mounting process as other electronic parts, the mounting work of the camera module by the handicraft can be eliminated, and productivity can be raised.

[Translation done.]